2012 Summary of Beaches
under Monroe County Department of Public Health Jurisdiction

Ontario Beach: Season from June 15, 2012 to Labor Day, Monday September 3, 2012
81 days

Open: 37 days 45.7 %
Closed: 44 days 54.3 %
Accurate prediction of condition: 67 %
Inaccurate prediction of condition: 33 %

If no model was employed and the beach was open all days:
Open Clean (Accurate): 42 days 52%
Open Dirty (Inaccurate): 39 Days 48%

With Model:
Open Clean 26 days
Open Dirty 11 Days

Reasons for Closure: (Given reason was partially or totally responsible for the closure issued on a day)

Rainfall	8 %	2 accurate	2 inaccurate
River Flow	0 %		
Clarity	21 %	11 accurate	3 inaccurate
Algae	1 %	1 accurate	2 inaccurate
Prior Day Bacteria	70 %	14 accurate	15 inaccurate

Accuracy is here based on status predicted by the operating model on a given day in relation to the results of samples collected on that day. 11 of the inaccuracies were open beach with subsequently reported exceedence of Health Standard. Another 18 inaccuracies were a closed beach that was subsequently found to be safe, that is all samples reported at less than the 235 mpn/100 mL single sample standard. The major factor in closure was prior day bacteria values, which were about evenly accurate and inaccurate in predicting the condition on the day subsequent to their collection. Rainfall, which is usually the most accurate predictor, failed to predict low counts in response to relatively heavy rain on July 26 and July 31. This may have been related to the early and hot spring and the long period of nearly rain free weather, which could have led to greater than normal infiltration and less runoff and associated washoff of bacteria than would have been encountered in a more normal year.

Also problematic in the operation of Ontario Beach in 2012 was the appearance and persistence of the algae Pediastrum. A non-motile, colony forming green algae found in freshwater environments, this algae was first seen in quantity at Ontario Beach in 2010, when a sample was collected for microscopic identification due to similarity between the bloom occurring at Ontario Beach and Harmful Algae Bloom (HAB) blooms occurring in other New York State Waters. While this species is not a cyanobacteria or a toxin producer, it does cause poor clarity to water in which it is found. The bloom was not persistent in 2010. However, another bloom was observed during the week before Memorial Day of 2012. A sample was collected and identified microscopically at the FEV Wastewater Treatment Plant laboratory. We were concerned that we might have a blue green bloom on an unseasonably warm holiday weekend and should issue an advisory if the material was cyanobacteria. A photo taken of this alga was communicated to Dr. Gregory Boyer at SUNY ESF, a recognized expert on cyanobacteria. Dr. Boyer was planning to be in the area on Memorial Day. He collected additional samples at Ontario and Durand beaches, and confirmed our identification of the algae as Pediastrum. In 2012, the Pediastrum bloom continued with short interruptions caused by wave events for the entire summer, and this contributed to closures for poor water clarity. Because the algae is a small colony of cells, and does not mat or clump like the usually encountered Spirogyra and Cladophora, it could cause unacceptable water clarity even when found in volumes that did not meet the current criteria for closures based on the amount of algae (1500 ft^3 per beach section). These algae may have been associated with some of the days when high bacterial counts were encountered with no corresponding environmental conditions other than the algae in the shallows.

Long term (days)

	Closed/ Dirty (TP)	Open/Clean (TN)	Closed/Clean (FP)	Open/Dirty (FN)
1998	22	31	10	17
1999	23	36	8	13
2000	31	29	6	14
2001	16	37	8	19
2002	7	44	14	8
2003	13	35	12	13
2004	18	31	15	16
2005	14	42	11	13
2006	10	38	20	12
2007	10	34	16	15
2008	17	35	9	12
2009	24	31	18	7
2010	23	33	19	6
2011	19	33	10	19
2012	26	26	18	11

Year	Accurate Predictions ((TP+TN)/(TP+TN+FP+FN))*100	Inaccurate Prediction ((FN+FP)/(TP+TN+FP+FN))*100
1998	66%	34%
1999	74%	26%
2000	75%	25%
2001	66%	34%
2002	70%	30%
2003	66%	34%
2004	61%	39%
2005	69%	31%
2006	60%	40%
2007	59%	41%
2008	71%	29%
2009	69%	31%
2010	64%	36%
2011	64%	36%
2012	67%	33%
98-12 Average	67 %	33%
Year	Inaccurate Prediction and Unsafe Condition (FN/(TP+TN+FP+FN))*100	Inaccurate Prediction and Safe Condition (FP/(TP+TN+FP+FN))*100
1998	21%	13%
1999	16%	10%
2000	17%	8%
2001	24%	10%
2002	11%	19%
2003	18%	16%
2004	20%	19%
2005	16%	14%
2006	15%	25%
2007	20%	21%
2008	16%	12%
2009	9%	22%
2010	7.4%	23%
2011	12.3%	23.5%
2012	13.6%	22.2
98-2012 Average	16%	17%

The following table summarizes reasons for closures.

Year	# of Open days	% Open	# of Closed days	% Closed	% River Flow	% Rain	% Algae	% Water clarity	% Bacteria	Total %
1976	50	76	16	24	3	84	0	13	0	100
1977	58	76	17	24	23	59	0	18	0	100
1978	69	94	4	6	0	88	12	0	0	100
1979	66	92	6	8	0	50	8	42	0	100
1980	68.5	94	4.5	6	33	45	0	22	0	100
1981	66	82	14	18	0	43	18	39	0	100
1982	72	90	8	10	0	44	12	19	25	100
1983	59	81	14	19	3	36	18	43	0	100
1984	42.5	58	30.5	42	16	16	12	56	0	100
1985	65	89	8	11	0	6	31	56	6	99
1986	47	69	21	31	0	43	0	57	0	100
1987	66	84	13	16	0	50	12	38	0	100
1988	61	84	12	16	0	58	8	33	0	99
1989	53	75	18	25	0	17	0	83	0	100
1990	53	73	20	27	0	40	28	32	0	100
1991	53	73	20	27	0	20	20	60	0	100
1992	31	46	36	54	28	28	5	36	3	100
1993	51	76	16	24	0	9	31	53	6	99
1994	40	54	34	46	3	23	36	28	9	99
1995	40	54	34	46	0	4	51	38	7	100
1996	39	53	34	47	9	12	38	38	3	100
1997	52	71	21	29	17	9	14	60	0	100
1998	48	60	32	40	24	20	12	35	9	100
1999	49	61	31	39	2	6	37	47	8	100
2000	43	54	37	46	1	15	41	27	16	100
2001	56	70	24	30	0	3	17	38	42	100
2002	52	71	21	29	5	2	7	86	0	100
2003	48	66	25	34	24	0	2	48	26	100
2004	49	61	31	39	6	9	33	52	0	100
2005	55	69	25	31	2	9	17	71	1	100
2006	50	62.5	30	37.5	1.3	20.3	2.7	73	2.7	100
2007	49	65	26	35	0	5	54	22	19	100
2008	46	63	27	37	0	13	19	17	51	100
2009	38	47.5	42	52.5	4.4	20.2	0	23	52.4	100
2010	39	48.1	42	51.9	0	16.3	7	36	40.7	100
2011	52	64	29	36	0	14.3	6.9	31.6	47.2	100
2012	37	45.7	44	54.3	0	7.6	1.1	21.2	70.1	100
Avg.	51.7	69	23.4	31	5.53	25.53	16.5	40.3	12.0	100

Ontario Beach Status 2012

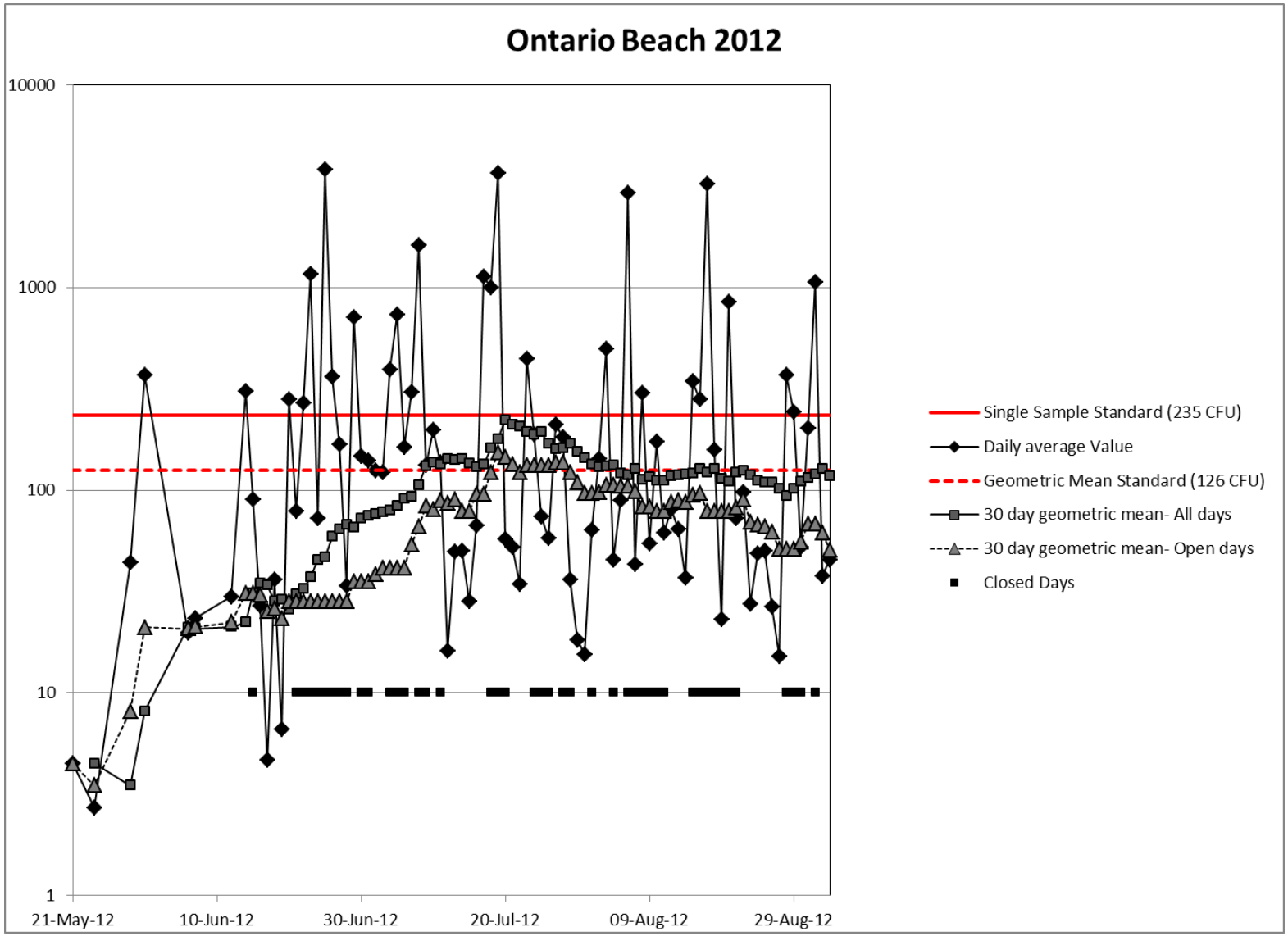
June	July	August	September
	1 Closed[9]	1 Closed [6]	1 Closed [8,9]
	2 Open	2 Open	2 Open
	3 Open	3 Open	3 Open
	4 Closed[9]	4 Closed [9]	
	5 Closed[8,9]	5 Open	
	6 Closed[9]	6 Closed [6]	
	7 Open	7 Closed [6,8,9]	
	8 Closed[9]	8 Closed [9]	
	9 Closed[9]	9 Closed [9]	
	10 Open	10 Closed [8,9]	
	11 Closed[9]	11 Closed [9]	
	12 Open	12 Open	
	13 Open	13 Open	
	14 Open	14 Open	
15 Closed[9]	15 Open	15 Closed [5,9]	
16 Open	16 Open	16 Closed [9]	
17 Open	17 Open	17 Closed [9]	
18 Open	18 Closed[9]	18 Closed [8,9]	
19 Open	19 Closed[8,9]	19 Closed [9]	
20 Open	20 Closed[8,9]	20 Closed [8]	
21 Closed[9]	21 Open	21 Closed [8,9]	
22 Closed[9]	22 Open	22 Open	
23 Closed[8,9]	23 Open	23 Open	
24 Closed[9]	24 Closed[9]	24 Open	
25 Closed[8]	25 Closed[9]	25 Open	
26 Closed[8,9]	26 Closed[5]	26 Open	
27 Closed[8,9]	27 Open	27 Open	
28 Closed[7,9]	28 Closed[9]	28 Closed [8]	
29 Open	29 Closed[9]	29 Closed [9]	
30 Closed[9]	30 Open	30 Closed [9]	
	31 Open	31 Open	

5. Local Stormwater: (Ontario Beach or Irondequoit Pump station gage) Rainfall (0600-0600) is 0.7"-1.5".
6. Local Stormwater: (Ontario Beach or Irondequoit Pump station gage) Rainfall total (0600-0600) is greater than or equal to 1.5".
7. Algae or other organic debris excessive, defined as > 1500 ft3 (6.5%)
8. Secchi disk depth is < 0.6 m. The beach is closed until the secchi disk is ≥ 0.8 m.
9. E. coli results for the prior day are greater than 235 mpn/100mL

Operating Criteria for 2012

ONTARIO BEACH: 2012 OPERATING CRITERIA	
CRITERIA	**ACTION**
1. Genesee River Stormwater: Rainfall (Glenwood Pump Station or 243) total (0600-0600) rainfall is > 0.7"; and peak rainfall intensity is > 0.4/hr".	A watch period is determined for each storm based on rainfall, river flow, and the time of peak rainfall intensity. (Beach Operating Manual p. 4) The beach is closed if the Genesee River flows west during the watch period.
2. Genesee River High Flow: Average flow (0600-0600) is greater than 3500 cubic feet per second (cfs) and less than 5000 cfs.	A pollution watch is in effect as long as flow remains greater than 3500 cfs. The beach is closed when the river flows west toward Ontario Beach.
3. Genesee River Extreme High Flow: Average flow (0600-0600) is greater than 5000 cfs.	The beach is closed until flow decreases to criterion #2 or monitoring instituted as part of the pollution watch indicates that the river is not a source of Fecal Coliform bacteria.
5. Local Stormwater: (Ontario Beach or Irondequoit Pump station gage) Rainfall (0600-0600) is 0.7"-1.5".	The beach is closed for 24 hours.
6. Local Stormwater: (Ontario Beach or Irondequoit Pump station gage) Rainfall total (0600-0600) is greater than or equal to 1.5".	The beach is closed for 48 hours.
7. Algae or other organic debris exceeds 1500 cubic feet in any beach section.	Affected sections of the beach are closed.
8. Secchi disk depth is $\leq$ 0.6 m.	The beach is closed until the secchi disk is $\geq$ 0.8 m.
9. E. coli results for the prior day are greater than 235 mpn/100mL	The beach is closed until E. Coli levels fall below 235 mpn/100 mL

Criterion 4 was discontinued in 2001. Criterion 4: (Local Stormwater: Lake Ontario West Basin (Ontario Beach or Irondequoit Pump Station gauges 0600-0600) rainfall 0.3" – 0.7" or peak rainfall intensity is > 0.2"/hr.


Ontario Beach 2012
10000
1000
100
10
1
21-May-12
10-Jun-12
30-Jun-12
20-Jul-12
09-Aug-12
29-Aug-12
Single Sample Standard (235 CFU)
Daily average Value
Geometric Mean Standard (126 CFU)
30 day geometric mean- All days
30 day geometric mean- Open days
Closed Days

Durand Eastman Beach 2012

Daily operation Sunday 6/24/2012 – Labor Day Monday September 3, 2012 72 days total

Open:	58 days	81 %
Closed:	14 days	19 %

Accurate prediction of condition: 76.4 %
Inaccurate prediction of condition: 23.6 %

If no model was employed and the beach was open all days
Open Clean (Accurate): 63 days 87.5%
Open Dirty (Inaccurate): 9 Days 12.5%

With Model:
Open Clean 52 days
Open Dirty 6 Days

Reasons for Closure:

Rainfall	27 %
River Flow	0 %
Clarity	17%
Algae	0 %
Prior Day Bacteria	56%

6 inaccuracies were open beach with subsequently reported exceedence of Health Standard. 11 inaccuracies were a closed beach that was subsequently found to be safe.

No single factor could be indicated as responsible for inaccurate closures, although prior day bacteria count was 86% (6 of 7 closures) inaccurate when no other factor was involved. For the earliest closures clarity was greater than the 0.6m contained in the model, but was still less than 1 m. No apparent environmental condition is associated with the high bacterial population on 7/24/2012. The high count on 8/24 follows rain by 2 days, and there may have been some delay in wash-off reaching the beach. The high counts at the end of August (8/28, 9/1) may have been associated with an increasing number of gulls using the area. It should also be noted that Lake Ontario levels were low, and there were both unusual accumulations of algae, and coving to the shoreline that was occurring as the lake level dropped. Consideration will be given to modification of the clarity criterion in the model for both Durand and Ontario beaches so that a secchi reading of 0.8 meters or less would trigger closure, rather than the current 0.6 m criterion for closure.

Long Term Performance of the Model (days)

	Closed/ Dirty (TP)	Open/Clean (TN)	Closed/Clean (FP)	Open/Dirty (FN)
2006	11	24	8	2
2007	7	64	10	8
2008	10	45	19	3
2009	16	41	21	4
2010	12	47	20	4
2011	9	44	12	7
2012	3	52	11	6

Year	Accurate Predictions ((TP+TN)/(TP+TN+ FP+FN))*100	Inaccurate Prediction ((FN+FP)/(TP+TN+ FP+FN))*100
2006	77 %	23 %
2007	80 %	20 %
2008	71 %	29%
2009	70%	30%
2010	71%	29%
2011	74%	26%
2012	76%	24%
Average 2006-12	74.1%	25.9%

Year	Inaccurate Prediction and Unsafe Condition (FN/(TP+TN+FP+FN))*100	Inaccurate Prediction and Safe Condition (FP/(TP+TN+FP+FN))*100
2006	4 %	18 %
2007	9 %	11 %
2008	4 %	25%
2009	5%	26%
2010	5%	24%
2011	9.7%	16.7%
2012	8.3%	15.3
Average 2006-12	6.4%	19.4%

Year	# of Open days	% Open	# of Closed days	% Closed	% River Flow	% Rain	% Algae	% Water clarity	% Bacteria	Total %
2006	26	58	19	42	0	29	0	66	5	100
2007	72	81	17	19	0	37	0	46	18	100
2008	48	62	30	38	0	46	0	16	38	100
2009	45	70	39	30	1	56	0	16	26	99
2010	51	61.4	32	38.6	0	30.2	0	42.7	27.1	100
2011	51	71	21	29	0	25.4	0	25.4	49.2	100
2012	58	81	14	19	0	35.7	0	10.7	53.6	100

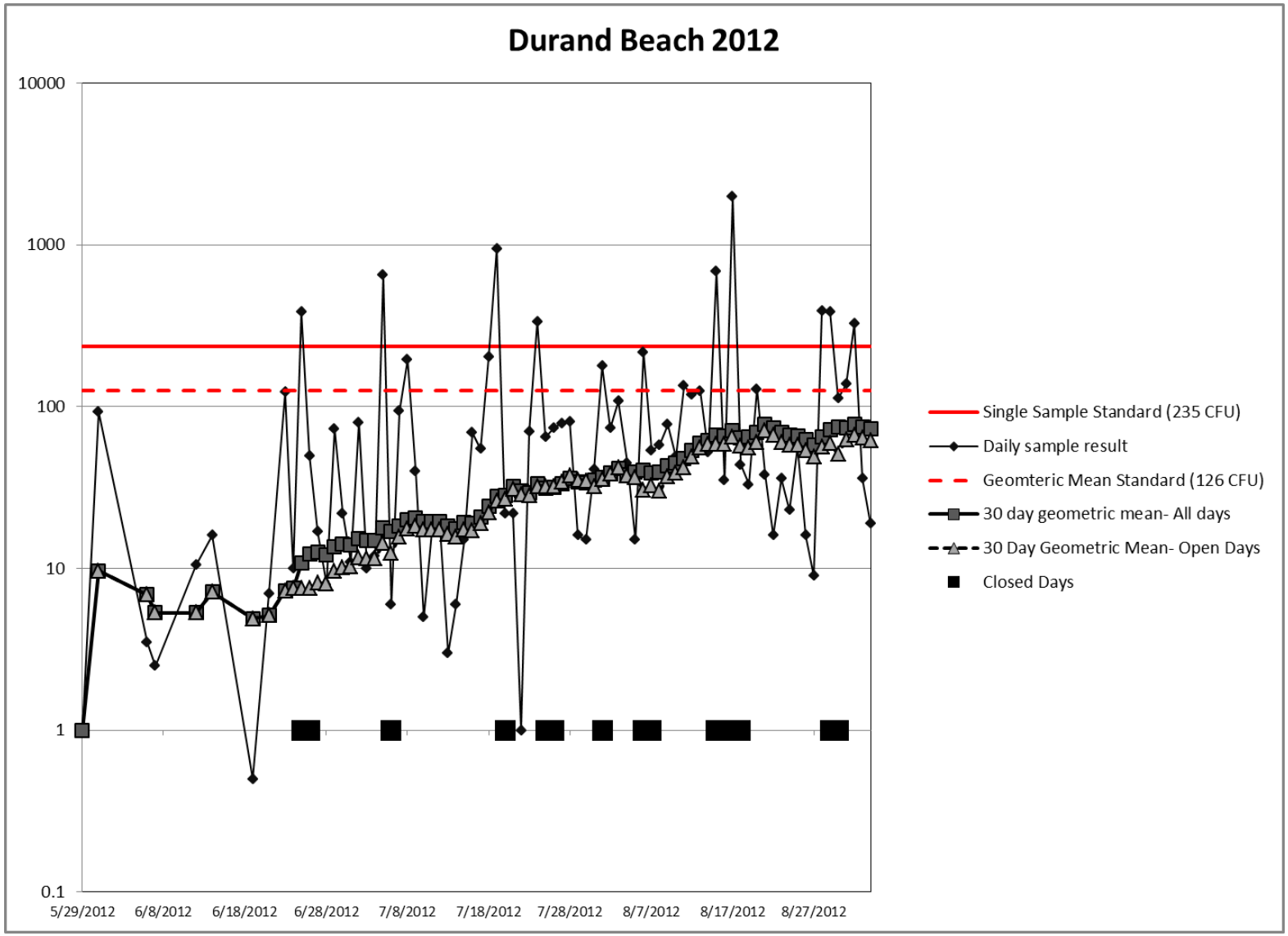
Durand Eastman Beach Summer 2012

June	July	August	September
	1 Open	1 Closed[4]	1 Open
	2 Open	2 Open	2 Open
	3 Open	3 Open	3 Open
	4 Open	4 Open	
	5 Open	5 Open	
	6 Closed[9]	6 Closed [5,8]	
	7 Open	7 Closed [5,8,9]	
	8 Open	8 Open	
	9 Open	9 Open	
	10 Open	10 Open	
	11 Open	11 Open	
	12 Open	12 Open	
	13 Open	13 Open	
	14 Open	14 Open	
	15 Open	15 Closed [4]	
	16 Open	16 Closed [9]	
	17 Open	17 Open	
	18 Open	18 Closed [9]	
	19 Open	19 Open	
	20 Closed[9]	20 Open	
	21 Open	21 Open	
	22 Open	22 Open	
	23 Open	23 Open	
24 Open	24 Open	24 Open	
25 Closed[8]	25 Closed [9]	25 Open	
26 Closed[8,9]	26 Closed [4]	26 Open	
27 Open	27 Open	27 Open	
28 Open	28 Open	28 Open	
29 Open	29 Open	29 Closed [9]	
30 Open	30 Open	30 Closed [9]	
	31 Open	31 Open	

3. Genesee River Extreme High Flow: Average flow (0600-0600) is greater than 5000 cfs.
4. Local Stormwater: (Ontario Beach or Irondequoit Pump station gage) Rainfall (0600-0600) is 0.4"-1.5".
5. Local Stormwater: (Ontario Beach or Irondequoit Pump station gage) Rainfall (0600-0600) is 1.5-3".
8. Secchi disk depth is < 0.6 m. The beach is closed until the secchi disk is ≥ 0.8 m.
9. E. coli results for the prior day are greater than 235 mpn/100mL

Operating Criteria for 2012

Durand: 2012 OPERATING CRITERIA	
CRITERIA	**ACTION**
1. Genesee River Stormwater: Rainfall (Glenwood Pump Station or 243) total (0600-0600) rainfall is > 0.7"; and peak rainfall intensity is > 0.4/hr".	A watch period is determined for each storm based on rainfall, river flow, and the time of peak rainfall intensity. (Beach Operating Manual p. 4) The beach is closed if the Genesee River flows east during the watch period.
2. Genesee River High Flow: Average flow (0600-0600) is greater than 3500 cubic feet per second (cfs) and less than 5000 cfs.	A pollution watch is in effect as long as flow remains greater than 3500 cfs. The beach is closed when the river flows east toward Durand Beach unless monitoring instituted as part of the pollution watch indicates that the river is not a source of Fecal Coliform bacteria (measured as E. Coli).
3. Genesee River Extreme High Flow: Average flow (0600-0600) is greater than 5000 cfs.	The beach is closed until flow decreases to criterion #2 or monitoring instituted as part of the pollution watch indicates that the river is not a source of Fecal Coliform bacteria(measured as E. Coli).
4. Local Stormwater: (Ontario Beach or Irondequoit Pump station gage) Rainfall (0600-0600) is 0.4"-1.5".	The beach is closed for the remainder of that day and an additional 24 hours.
5. Local Stormwater: (Ontario Beach or Irondequoit Pump station gage) Rainfall total (0600-0600) is greater than 1.5" and less than or equal to 3".	The beach is closed for the remainder of the day and an additional 48 hours.
6. Local Stormwater: (Ontario Beach or Irondequoit Pump station gage) Rainfall total (0600-0600) is greater than or equal to 3 inches.	The beach is closed for the remainder of the day and an additional 72 hours.
7. Algae or other organic debris exceeds 1500 cubic feet.(for a 300 foot beach)	The beach is closed.
8. Secchi disk depth is $\leq$ 0.6 m.	The beach is closed until the secchi disk is $\geq$ 0.8 m.
9. E. coli results for the prior day are greater than 235 mpn/100mL or the 30 day geometric mean of results for days when the beach was open is greater than 126 mpn/100 ML	The beach is closed until E. Coli levels fall below 235 mpn/100 mL and the 30 day geometric mean of results for days when the beach was open is less than or equal to 126 mpn/100 ML


Durand Beach 2012
10000
1000
100
10
1
0.1
5/29/2012
6/8/2012
6/18/2012
6/28/2012
7/8/2012
7/18/2012
7/28/2012
8/7/2012
8/17/2012
8/27/2012
Single Sample Standard (235 CFU)
Daily sample result
Geomteric Mean Standard (126 CFU)
30 day geometric mean- All days
30 Day Geometric Mean- Open Days
Closed Days